

## **REMARKS**

Claims 1-4, 7-9, and 11-13 are now pending in the application. Claim 1 is amended by including features of dependent claims 5, 6, and 10, which are now cancelled. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the amendments and remarks contained herein.

### **1. REJECTIONS UNDER 35 U.S.C. § 102**

Claims 1-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Dunn 3,959,204, Palmer 4,251,416 or Verenkova RU 2071491.

Amended independent claim 1 includes, among other features, a first compound in an amount from greater than 0 to about 4 parts by weight of the composition and a second compound in an amount from greater than 0 to about 2 parts by weight of the composition, wherein the salts of the at least one second compound are selected from the group consisting of chlorides, sulfates, nitrates, and combinations thereof. The Dunn, Palmer, and Verenkova references do not anticipate Claim 1 as each reference is missing one or more features. The shortcomings of these three references are addressed in turn.

Dunn teaches latex-based coating materials with a calcium carbonate filler. Dunn abstract; col. 1, line 6; col. 2, lines 60-61. The second compound in claim 1 includes a Group IIA salt, a Group IIIA salt, a Group IIIB salt, a copper salt, a zinc salt, a cadmium salt, a manganese salt, an iron salt, a cobalt salt, or a nickel salt to a latex, wherein the salts of the second compound are selected from the group consisting of chlorides, sulfates, nitrates, and combinations thereof. Thus, the second compound in

claim 1 does not include carbonates, and more particularly, does not include calcium carbonate. Accordingly, claim 1 not anticipated by Dunn.

Palmer discloses a latex emulsion where the focus is on the incorporation of gypsum (i.e., calcium sulfate dihydrate) into an adhesive composition for use as a carpet backing. Palmer abstract; col. 1, lines 4-6; col. 1, lines 53-54. The amount of gypsum used is generally from about 50% to about 70% by weight, although it may be from about 10% to about 80%, with 55% to 65% preferred, and the various examples use about 65% gypsum. Palmer col. 2, lines 19-23; Examples 1-5. In contrast, claim 1 includes a second compound in an amount from greater than 0 to about 2 parts by weight of the composition, which far less than the preferred range in Palmer, the examples, and even the lowest limit taught in Palmer. To illustrate, the present claim includes a second compound in an amount from greater than 0 to about 2 parts by weight of the composition, which the present Examples describe an embodiment of 5 g of 30%  $\text{CaCl}_2$  solution, mixed with 100 g of latex and 5 g of 35%  $(\text{NH}_4)_2\text{HPO}_4$  solution, which results in approximately 1.5 g of  $\text{CaCl}_2$  in 110 g total composition, therefore giving about 1.4% by weight  $\text{CaCl}_2$ . Consequently, claim 1 is not anticipated by Palmer.

Verenkova appears to describe a fire resistant composition that includes 35-55% (by weight) of a silicate of an alkali metal and 2.5-7.0% (by weight) of a phosphate binder of calcium/zinc/phosphate/nitrate/borate, Ca/Zn/sodium/fluoroborate, or Zn/aluminum/phosphate. However, the first compound of claim 1 is only present in an amount from greater than 0 to about 4 parts by weight of the composition, which is far less than 35-55% of the silicate of an alkali metal in Verenikova. In addition, the claimed second compound is only present in an amount from greater than 0 to about 2 parts by

weight of the composition, which is less than the 2.5-7.0% (by weight) of a phosphate binder of calcium/zinc/phosphate/nitrate/borate, Ca/Zn/sodium/fluoroborate, or Zn/aluminum/phosphate. As the claimed ranges are not taught by the reference, claim 1 is not anticipated.

Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.

## **2. REJECTIONS UNDER 35 U.S.C. § 103**

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn 3,959,204, Palmer 4,251,416 or Verenkova RU 2071491.

The Office Action rejected Claims 1-13 over the three references in the alternative, but also seems to imply that the salts of Verenkova could be used in combination with the other references. As such, the following remarks address each reference in turn followed by the combination of references.

As detailed in the preceding section, Dunn fails to teach the second compound in claim 1 that includes various salts, wherein the salts are selected from the group consisting of chlorides, sulfates, nitrates, and combinations thereof. Instead, Dunn uses calcium carbonate fillers that are compounded in large quantities with latex. Dunn abstract; col. 2, lines 60-61. According to the reference, lattice stability is a problem with alkaline earth metals, such as calcium carbonate filler. Dunn overcomes this problem by adding an alkali metal or ammonium fluoride. Dunn col. 1, lines 34-39. Dunn is focused on addressing and overcoming issues specifically related to the use of calcium carbonate so that less expensive quarried carbonate could be used, for

example. Dunn col. 1, lines 10-20. There is no teaching, suggestion, or motivation provided in Dunn to use salts other than calcium carbonate, as inclusion of other salts would contravene the purpose of Dunn's teachings. Therefore, a skilled artisan would not modify the Dunn reference by using salts other than carbonates, and the skilled artisan would not look to the salts in present claim 1.

As noted above, Palmer fails to teach the amounts of the second compound in claim 1. Instead, Palmer uses significantly more gypsum (calcium sulfate dihydrate), i.e., about 50% to about 70% by weight, although it may be from about 10% to about 80%, with 55% to 65% preferred, and the various examples use about 65% gypsum. In fact, it is an object of the Palmer invention to provide a carpet having a gypsum-filled backing. Palmer col. 1, lines 53-54. Thus, Palmer does not disclose the claimed range of the second compound. Moreover, Palmer's preferred range of gypsum and the Examples are between 55% to 65% gypsum, thereby motivating the skilled artisan to move towards or stay within these ranges, which are far above the presently claimed range. Therefore, there is no teaching, suggestion, or motivation found in Palmer by which a skilled artisan would drop the amount of gypsum into the range of the second compound in present claim 1.

Verenkova fails to teach the claimed amounts of both the first compound and the second compound of claim 1. In particular, Verenkova uses 35-55% (by weight) of a silicate of an alkali metal, which is far in excess of the 0 to about 4 parts by weight claimed for the first compound, and Verenkova uses 2.5-7.0% (by weight) of a phosphate binder of calcium/zinc/phosphate/nitrate/borate, which exceeds the claimed 0 to about 2 parts by weight claimed for the second compound. The Verenkova

composition is used as a fire resistant coating and since the silicate of an alkali metal is the predominant active component of the composition, it is very unlikely that the fire resistance would be retained were the concentration of 35-55% dropped to within the presently claimed amount of greater than 0 to about 4 parts by weight for the first compound. Consequently, there is no teaching, suggestion, or motivation provided in the reference whereby a skilled artisan would significantly drop the concentration of predominant ingredient, being the silicate of an alkali metal.

The preceding remarks have illustrated that independent claim 1 is not obvious in view of the three references when taken individually. Likewise, the following remarks will illustrate that any combination of these references fails to establish a prima facie case of obviousness.

The Dunn, Palmer, and Verenkova references each have different goals and do not provide any motivation by which a skilled artisan would combine their teachings. For example, Dunn provides a method for compounding latex with large quantities of calcium carbonate filler – use of any other salt would be contrary to the teachings of Dunn, which have overcome earlier problems using calcium carbonate. The objects of Palmer include producing an adhesive composition having gypsum for backing carpet. The preferred large amounts of gypsum employed in Palmer teach away from using other salts or using other amounts of gypsum, including the much lower claimed amounts of salts. Thus, the teachings of Dunn and Palmer would not lead a skilled artisan to combine these references, as each reference has its chosen and exclusive salt.

Addition of Verenkova to Dunn and/or Palmer would not cure the deficiencies of either reference. Verenkova uses a phosphate binder of calcium/zinc/phosphate/nitrate/borate in place of calcium carbonate (Dunn) or gypsum (Palmer), and does not use the phosphate binder in the large amounts of calcium carbonate or gypsum found in the other references. Conversely, Verenkova uses a large amount (35-55%) of a silicate of an alkali metal, where Dunn and Palmer use small amounts of potassium/ammonium fluoride (0-0.50 parts) and ammonium/sodium sulfate (0.5-5%), respectively. Thus, the proportions of a "first compound" and a "second compound" are opposite in Verenkova compared to Dunn and Palmer. A skilled artisan would not combine these contrary teachings and there is no suggestion or motivation by which a skilled artisan would pick and chose particular salts or quantities of salts. As such, combinations based on these three references fail to establish a prima facie case of obviousness for independent claim 1.

Finally, the nanocomposite composition formed by the presently claimed methods exhibits unexpected results that are not taught or suggested by the combination of references. In particular, the presently claimed methods result in a polymer nanocomposite that has improved mechanical and heat aging properties as compared to polymer without the inorganic particles. Paragraph [0013]. Benefits include film having increased tensile strength, elongation, and heat resistance. Paragraph [0024]. These benefits are illustrated in Examples 3-7 and Figures 3-7, which demonstrate the effects of the nanocrystals versus latex without the nanocrystals.

Accordingly, Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.

## CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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